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- AN - 1996:515033 BIOSIS  
DN - PREV199699237389  
TI - Analysis of hardening related proteins in *Lolium temulentum* L.  
IN - Tase, Kazuhiro (1); Kobayashi, Makoto; Fujii, Hiroki (1)  
CS - (1) Hokuriku Natl. Agric. Experiment Stn., Inada, Joetsu, Niigata 943-01 Japan  
SO - Grassland Science, (1996) Vol. 42, No. 2, pp. 117-122. ISSN: 0447-5933.  
DT - Article  
LA - English  
SL - English; Japanese  
AB - This study was carried out to identify protein changes occurring through hardening in *Lolium temulentum* L. and to analyze N-terminal amino acid sequences of these hardening related proteins. The development of the freezing tolerance was mostly obtained after 2 weeks exposure to hardening treatment. Thus, the proteins extracted from seedlings of non-hardened and hardened for 2 weeks were analyzed by two-dimensional polyacrylamide gel electrophoresis (2DPAGE). One newly induced protein and six proteins increased in intensity were identified in hardened seedlings, as compared to non-hardened seedlings. To get some information about these proteins, N-terminal amino acid sequences analysis were carried out using gas-phase protein sequencer and N-terminal amino acid sequences of five proteins were determined. As the result of homology search with a protein sequence data bank, several of these proteins were homologous to abscisic acid (ABA)-inducible protein of alfalfa (*Medicago sativa* L.), ribulose-bisphosphate carboxylase (Rubisco) large-subunit binding protein beta chain in garden pea (*Pisum sativum* L.) and leaf fructose diphosphate aldolase in spinach (*Spinacia oleracea* L). The information of partial amino acid sequences would be helpful in estimating the function of hardening related proteins, and for molecular cloning.  
CC - External Effects - Temperature as a Primary Variable - Cold \*10616  
Metabolism - Proteins, Peptides and Amino Acids \*13012  
Temperature: Its Measurement, Effects and Regulation - Thermoadaptation \*23010  
Plant Physiology, Biochemistry and Biophysics - Metabolism \*51519  
Plant Physiology, Biochemistry and Biophysics - Chemical Constituents \*51522  
BC - Gramineae 25305  
Chenopodiaceae 25795  
Leguminosae \*26260  
IT - Major Concepts  
Biochemistry and Molecular Biophysics; Metabolism; Physiology  
IT - Chemicals & Biochemicals  
POLYACRYLAMIDE; ABSCISIC ACID; RIBULOSE-1,5-BISPHOSPHATE CARBOXYLASE-OXYGENASE; FRUCTOSE DIPHOSPHATE ALDOLASE  
IT - Sequence Data  
amino acid sequence; molecular sequence data  
IT - Miscellaneous Descriptors  
ABSCISIC ACID; ANALYTICAL METHOD; BIOCHEMISTRY AND BIOPHYSICS; CHEMICAL COORDINATION; FREEZING TOLERANCE; FRUCTOSE DIPHOSPHATE ALDOLASE; METABOLISM; MOLECULAR CLONING USEFULNESS; POLYACRYLAMIDE GEL ELECTROPHORESIS; RIBULOSE-1,5-BISPHOSPHATE CARBOXYLASE-OXYGENASE  
ORGN- Super Taxa  
Chenopodiaceae: Dicotyledones, Angiospermae, Spermatophyta,

Plantae; Gramineae: Monocotyledones, Angiospermae, Spermatophyta,  
Plantae; Leguminosae: Dicotyledones, Angiospermae, Spermatophyta,  
Plantae; Plantae - Unspecified: Plantae

ORGN- Organism Name

alfalfa (Leguminosae); garden pea (Leguminosae); plant (Plantae -  
Unspecified); spinach (Chenopodiaceae); Lolium  
temulentum (Gramineae); Medicago sativa (Leguminosae); Pisum  
sativum (Leguminosae); Spinacia oleracea (Chenopodiaceae)

ORGN- Organism Superterms

angiosperms; dicots; monocots; plants; spermatophytes; vascular  
plants

RN - 9003-05-8 (POLYACRYLAMIDE)

21293-29-8 (ABSCISIC ACID)

9027-23-0 (RIBULOSE-1,5-BISPHOSPHATE CARBOXYLASE-OXYGENASE)

9024-52-6 (FRUCTOSE DIPHOSPHATE ALDOLASE)